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INVITED COMMENTARY

Commentary on 'Endovascular Versus Open Repair as Primary Strategy for Ruptured Abdominal Aortic Aneurysm: A National Population-based Study'

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The optimal choice between endovascular (EVAR) and open repair for ruptured abdominal aortic aneurysm (rAAA) is a highly controversial and debated subject. Some real-world observational studies indicate more favorable periprocedural outcomes with EVAR, as might be expected with case selection. Conversely, several prospective randomized studies of EVAR versus open repair show equivalent periprocedural mortality, but by their design they are not all inclusive. The study by Gunnavasson et al. is based on an inclusive nationwide registry (Swedish Vascular Registry).[1] Essentially, they found no difference in overall mortality at 30 days, 1 year, and 2 years between centers with a preference for EVAR and those with a preference for open repair. This report has value not only because of reliable midterm mortality data, but also because of the spectrum of preference for EVAR or for open repair between centers for patients with rAAA. The authors divided the 29 vascular surgery centers into the three performing more EVAR than open repairs (176/236 procedures EVAR [75%], all referral academic centers) and the 26 centers with a preference for open repair (901/1,068 procedures open repair [84%]). Key results given in Table 3 in the original article report that centers with a preference for EVAR had a higher mortality rate than those with a preference for open repair at 30 days, 1 year, and 2 years for both open repair and EVAR. How and why is it that these two diverse center subsets have, in general, overall equivalent mortality outcomes? This is of particular interest for 30-day mortality, where prior observational studies favor EVAR. One might assume that this is due to the fewer number of patients in the centers with a preference for EVAR ($n = 236$) than in those with a preference for open ($n = 1{,}068$), but that does not appear to be the case. A quick extrapolation of the results, based on an equal number of patients ($n = 652$) in each preference group and the same percentages of 30-day mortality for both procedures in the two center groups (as given in Table 3 in the original article), predicts an overall mortality of 27.5% for centers with a preference for EVAR and 27.1% for those with a preference for open repair. With regard to 30-day mortality, this is very close to the 28.0% for EVAR centers and 27.4% for open centers (given in Table 3 in the original article). Diverse sample size is not the explanation. The answer to this puzzle may well be the wide spectrum of mortality risk between patients. The primary EVAR centers possibly used open repair (25% of patients) primarily for hemodynamically unstable patients, clearly a high-risk group, while using EVAR (75% of patients) in some patients with adverse neck anatomy. In contrast, the primary open centers were highly selective for EVAR (16% of patients) giving very good outcomes, much lower than the EVAR preference centers, as well as lower open repair mortality possibly due to inclusion of more patients at lower risk. The ratios of patients selected for EVAR versus open repair were far apart in the two preference groups (3:1 for EVAR centers vs. 1:5 for open centers). Perhaps both preference extremes place some patients into a procedure that has a higher patient specific mortality risk than that of the alternative procedure. Differences in mortality risk between the two rAAA repair preference groups could balance out as overall equality of morbidity outcomes in this study. Could procedure ratios closer to 50:50 have a significantly lower mortality?

Patient selection, patient mortality risk, and preference for a procedure are complex coupled variables that make it difficult to determine the optimum procedure choice to minimize the risk of mortality for patients with rAAA. While the near equality of 30-day, and 1- and 2-year mortality based on a wide spectrum of preference for EVAR or open repair in this study indicates that diverse center preference may make little difference in overall mortality outcomes, the results also indicate that preprocedure mortality risk may be an important variable that needs to be addressed and included. Perhaps future studies grouping rAAA patients by levels of preprocedure mortality risk score will identify one or more subset risk levels that have a projected significantly lower mortality with EVAR than with open repair, or vice versa.

REFERENCE

1 Gunnarsson K, Wanhainen A, Gidlund KD, Björck M, Mani K. Endovascular versus open repair as primary strategy for ruptured abdominal aortic aneurysm: a national population-based study. *Eur J Vasc Endovasc Surg* 2015;**51**:22–8.

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